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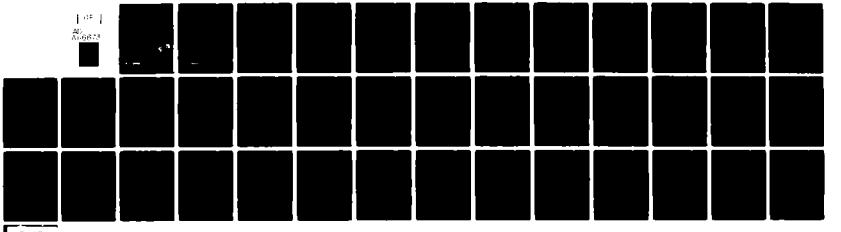

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A RAND NOTE

SOVIET DEMOGRAPHIC TRENDS AND THE ETHNIC COMPOSITION OF DRAFT AGE MALES, 1980-1995

Edmund Brunner, Jr.

February 1981

N-1654/1

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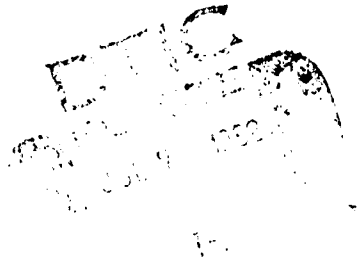

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PREFACE

This Note is one of a series of Rand documents dealing with the importance and implications of the ethnic factor in the armed forces of the USSR.

The Soviet leadership is facing increasingly difficult demographic problems affecting the ethnic composition of young men available for conscription. Because of demographic shifts, declining proportions of the draft-age cohort are available from the European regions of the Soviet Union, while the proportions emanating from the Caucasus, Central Asia, and Kazakhstan are increasing. The latter areas are heavily populated by ethnic groups with Turkic and Iranian Muslim backgrounds.

The main purposes of the Note are to examine ethnic-demographic trends in the USSR over the past 20 years, to project trends that seem likely to occur between 1980 and 1995, and to estimate the numbers and ethnic composition of draft-age (18-year-old) males becoming available to the Soviet Union during this period. In addition, some speculations are offered about the implications of the demographic trends for Soviet policies.

This work should be of interest to specialists and intelligence users who analyze Soviet military behavior and capabilities, and especially to those interested in Soviet military manpower policies and practices.

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SUMMARY

The histories of Imperial Russia and of the Union of Soviet Socialist Republics contain a long record of strife between ethnic Russians and other ethnic groups, most of whose members inhabit the constituent republics forming the western and southern border areas of the USSR. Demographic trends of the last two decades have been such that ethnic Russians and other Slavic peoples represent steadily declining proportions of the total population of the Soviet Union, while non-Russians, particularly Muslim-Turkic peoples, are steadily gaining in relative strength. These trends will continue in the foreseeable future.

The USSR is embarking on the decade of the 1980s while suffering from severe economic difficulties and growing labor imbalances and shortages which are exacerbated by the demographic shifts noted above. These shifts are reflected in the ethnic composition of the cohorts of young males available to the economy and to the armed forces. The ongoing demographic trends must be of concern to the Kremlin because of long-standing nationality problems, ethnic antagonisms, and the educational and linguistic handicaps characteristic of the USSR's minority peoples. This Note reviews population trends since 1959 and makes projections to 1995, with particular attention to the changing ethnic composition of the 18-year-old male cohort subject to conscription.

The Soviet Union's population growth rate slowed from 1.34 percent annually between 1959 and 1970 to 0.92 percent per year between 1970 and 1979; the rates for ethnic Russians in these two time periods were 1.12 percent and 0.70 percent, respectively. Although growth rates for non-Russian peoples, including Slavs in the Ukraine and Belorussia, also were lower in the second period than in the first, the growth rates for Muslim-Turkic peoples rose *relative* to the rate for the USSR as a whole. These differentials mean that the Russian share of the Soviet Union's population fell from 54.6 percent in 1959 to 52.4 percent in 1979, whereas that of Muslim-Turkic peoples rose from 12.6 percent in

1959 to 17.4 percent in 1979, and there are now about 46 million of them. Russians lost in relative strength in their own republic (the RSFSR), in the Transcaucasus, and in Central Asia, but gained in the Ukraine, Belorussia, and the Baltic republics. In the Ukraine, Belorussia, and Baltic republics indigenous ethnic groups have lost ground in their homelands and in the USSR as a whole. Elsewhere, and particularly in the Central Asian republics, indigenous ethnic groups have gained, relatively, in their homelands and in their percentages of the total population of the Soviet Union.

Projections of the total population and of the numbers of draft-age males, by ethnic group, to 1995 were made by the development and application of simple regression equations. The results show that: (1) The estimated total number of 18-year-old males becoming available annually will decline from about 2.39 million in 1980 to about 2.15 million in 1985, and then rise to approximately 2.31 million in 1995; (2) the Muslim-Turkic group is the only one which will gain in its share of the total population of the USSR during this period; (3) it is the only group in which the percentages of all Soviet draft-age males will increase, from about 23.5 percent in 1980 to about 28.7 percent in 1995; and (4) ethnic Russians now appear to comprise less than half (49 percent) of the draft-age male cohort, and by 1995 will comprise about 46 percent of the total.

The Kremlin, in theory at least, has several options it might pursue to cope with its labor and military manpower problems. Among these options are measures for economic reform and increased productivity, lengthening the term of military service, reduction of the size of the armed forces, changes in ethnic policies in the military, and a strategy of "muddling through." By such means some modest progress may gradually be achieved at a cost, but for the most part the USSR's military manpower problems may remain unsolved for the next decade or so.

ACKNOWLEDGMENTS

Comments by Rand colleagues Nancy Nimitz and S. Enders Wimbush resulted in significant improvements in this Note and prevented its author from making some errors. These critics are not responsible for any imperfections which remain.

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I. INTRODUCTION

The USSR is entering the 1980s faced with current and increasing labor imbalances and shortages. For Soviet manpower planners, the labor picture is complicated by the rapidly changing ethnic makeup of the available and future military and nonmilitary labor cohort. In short, the number of Soviet Slavs (Russians, Ukrainians, and Belorussians), around whom state power and authority traditionally have been established, is diminishing, whereas the number of Soviet Asians (Central Asian and other Turkic and/or Muslim peoples) is rapidly growing. This demographic shift, which already is being reflected in the military and nonmilitary labor cohort, raises questions of labor efficiency and resource allocation, as well as fundamental concerns about the reliability of non-Slavs in uniform to defend the Soviet state.* Combat forces, especially the Air, Naval, Rocket, and Air Defense forces are manned almost entirely by Slavs. Although some Central Asians are in the Ground Forces, most of them are assigned to construction battalions or to menial duties in various support functions.

The aim of this Note is to describe recent demographic trends in the USSR, paying particular attention to the changing ethnic composition of the military draft-eligible cohort, and to project these trends from 1980 to 1995. In projecting demographic trends to 1995, we shall describe the data base, the method of estimating, and the results.

This study specifically addresses the question of the size of the military manpower cohort--that is, the supply of 18-year-old males†--in the future.

From 1980 to 1995, the number of Soviet males who become 18 years old each year will vary between approximately 2.1 and 2.4 million. This cohort must supply both military and nonmilitary labor requirements.

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*See *The Ethnic Factor in the Soviet Armed Forces: Preliminary Findings*, by S. Enders Wimbush and Alex Alexiev, N-1486/1, The Rand Corporation, May 1980.

†The Law of Universal Military Service of 1967 makes all Soviet males subject to conscription upon their 18th birthday.

By conservative estimate, the military alone requires approximately 1.7 million new 18-year-old male conscripts each year given current Soviet force size.* We are unaware of the numbers of these young males which Soviet planners deem necessary for the needs of the economy. Nevertheless, assuming no change in the conscription law or terms of service, or in labor productivity, an annual military requirement of 70 to 80 percent of the 18-year-old male cohort implies that relatively inadequate numbers will become available for civilian purposes. With this consideration in mind, we turn to the examination of demographic and ethnic change in the Soviet Union.

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*Murray Feshbach and Stephen Rapawy, "Soviet Population and Manpower Trends and Policies," in *Soviet Economy in a New Perspective, A Compendium of Papers,* submitted to the Joint Economic Committee, Congress of the United States, 94th Congress, 2nd Session, October 14, 1976.

II. THE ETHNIC AND GEOGRAPHIC BACKGROUND

The USSR is frequently referred to as Russia and its inhabitants as Russians. In fact, however, the Soviet population is composed of more than 100 different ethnic strains speaking as many languages. While Russians still comprise the major ethnic group, their relative numbers have been steadily declining and now represent--by Soviet estimates--only slightly more than one-half the total population. For reasons which rest in the histories of Imperial Russia and of the Soviet Union, the USSR is now composed of 15 constituent republics, each of which is named after the predominant ethnic group residing within it.* These groups, plus the Tatars (who have no constituent republic), are the most important numerically.

In the course of the years there have been many attempts to assert national rights and to achieve autonomy. In pre-Bolshevik times, the Tsarist empire followed a policy of absolute domination of non-Russian nationalities, and Lenin referred to the empire as "the prison of nations." Several groups achieved independence during the chaos following World War I, and ethnic unrest spread even into Central Asia. The Bolshevik regime clearly could not tolerate the loss of many important areas which would deprive the Soviet Union of sources of grain, oil and other minerals, and cotton, as well as access to the outside world. Employing both political and military means, the regime set about regaining territories and suppressing separatist tendencies. According to Robert Osborn, "ultimately the political fate of every national area was settled by force of arms."†

Nationalist tendencies, nevertheless, could not be entirely eradicated by this means. The Kremlin thus adopted the policy of

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*The Kazakh republic is a temporary exception. At present the Kazakhs are outnumbered by Russians living in that republic. However, by about 1990 the indigenous Kazakh population will exceed that of the Russians in Kazakhstan and will constitute its most numerous ethnic group.

†R. J. Osborn, *The Evolution of Soviet Politics*, The Dorsey Press, Homewood, Illinois, 1974.

gradually establishing the constituent republics and granting them a degree of cultural and linguistic autonomy, plus the theoretical right to secede. Troubles continued to persist, however, as collectivization and the great purges of the 1930s bore with especial weight on non-Russian people. Under the pressures of World War II, the regime's fears of minority disloyalty resulted in the eastward deportation of entire groups of minority peoples. These fears were not unfounded; several hundred thousand non-Russians defected to the Germans to fight against the Soviet state. The Kremlin's continuing concern about the nationalities problem is reflected in various statements by L. I. Brezhnev. During his address to the Supreme Soviet in December 1972 he referred to the "drawing together of the nations and nationalities of our country," and declared that "the Party regards as impermissible any attempt whatsoever to hold back the process of the drawing together of nations, to obstruct it on any pretext or artificially to reinforce national isolation;" and in a 1976 speech at the 25th Party Congress he noted some "population problems which recently have become exacerbated."

A glance at the map (Fig. 1) will indicate the geographical disposition of the constituent republics and thus the principal area of residence of the ethnic groups for which they are named. The vast Russian republic (the RSFSR)* dominates the map, stretching from the western reaches of the Soviet Union to the Pacific and from the Arctic Ocean to much of China and Mongolia on the south. Surrounding the RSFSR, and forming the Soviet Union's frontiers with Europe (except Finland), Turkey, Iran, Afghanistan, and portions of China are the other 14 constituent republics. In the northwest are the Estonian, Latvian, and Lithuanian SSRs. Part of the Lithanian republic along with all of the Belorussian and part of the Ukrainian republic front on Poland, while the Ukrainian republic and the Moldavian SSR provide the Soviet Union's frontiers with Czechoslovakia, Hungary, and Romania. In the

*The RSFSR is itself divided into a large number of Autonomous Soviet Socialist Republics, Autonomous Oblasts, and Nationality Okrugs, which are themselves the home territories of the Tatars, the Bashkirs, the Chuvash, the Yakuts, and many other ethnic groups.

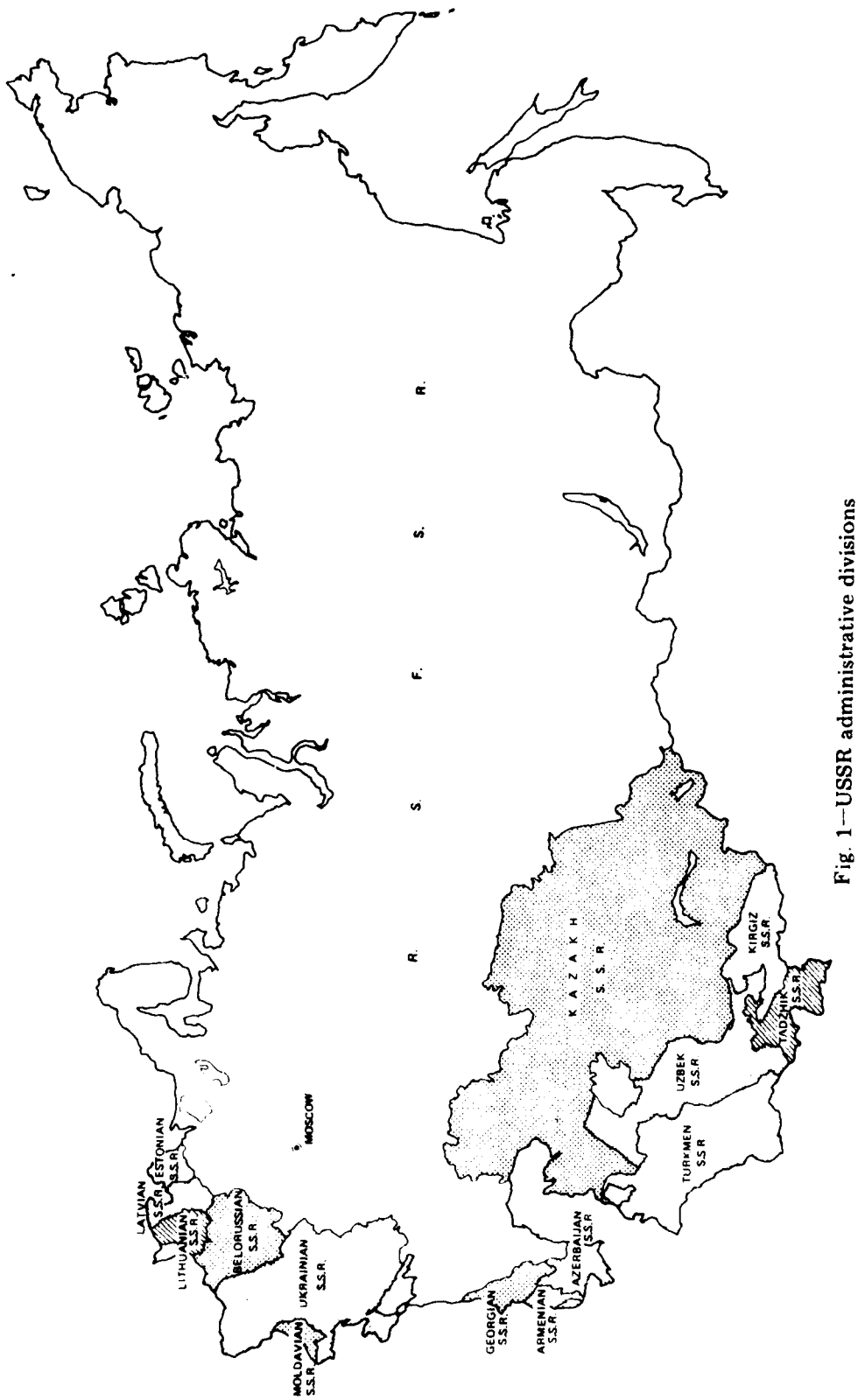

Fig. 1—USSR administrative divisions

southwest the Transcaucasian republics of Georgia, Armenia, and Azerbaidzhan form the borders with Turkey and a part of Iran. In Central Asia the Turkmen, Uzbek, and Tadzhik republics face the remainder of Iran and Afghanistan, while part of the Tadzhik SSR, the Kirgiz SSR, and the Kazakh SSR form the Soviet frontiers with northwestern China.

The religious heritage of the peoples of the various republics is diverse. Most Russians, Eastern Ukrainians, Belorussians, and Georgians are Catholic, mainly Eastern Orthodox. The Western Ukrainians are of Eastern Catholic persuasion. The Estonians and Latvians are Lutheran for the most part, while the Lithuanians are Catholic. The Armenians are Armenian Gregorian. Inhabiting the southern border republics from Azerbaidzhan on the west, through the Central Asian republics, and on to the eastern reaches of Kazakhstan are millions of Muslims, mostly Sunnis.* For various reasons, including ill-treatment and repression of its Muslim minorities for years and the complex network of political and religious hostilities in the Islamic world on its southern frontiers, the Kremlin must regard with some concern the rapidly increasing numbers of Muslim-Turkic peoples inhabiting its southern regions. It is from these areas that substantial and growing proportions of accessions to the Soviet labor force and armed forces must be drawn. It is thus of interest to examine demographic trends in the USSR during the last twenty years and then to forecast what these may be in the future.

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*Sunnis comprise the dominant element of Islam, while the Shiites are essentially a Persian variant of the Muslim religion which split from its main stream centuries ago over a theocratic question. Iran is the main Shiite center, but some Shiites also reside in Iraq, Pakistan, Yemen, Oman, and Saudi Arabia, and the Soviet republic of Azerbaidzhan is almost 100 percent Shiite.

III. SOVIET DEMOGRAPHIC TRENDS, 1959-1979

The data appearing in this section were taken from the official Soviet censuses of 1959, 1970, and 1979, the only years since World War II in which a complete nationwide census was conducted. All figures are as of January of each of the census years. While a great deal of information about the population and its characteristics appears in the census volumes,* we are concerned here simply with the numbers of people and their ethnic and geographic distribution.

We first examine the figures for each republic. These provide a breakdown among Russians and non-Russians, ethnic nationals residing in their own republics, and non-Russians residing in republics other than their own. Table 1 shows the numbers of people in each category by republic. It will be noted that the RSFSR is by far the most populous republic, with more people than all the others combined. (It also has more than twice their total area.) In 1979 the RSFSR contained about 138 million people and the second most populous republic, the Ukraine, only about 50 million. The Uzbek and Kazakh republics of Central Asia, with roughly 15 million each, rank third and fourth, respectively. The rank order of these four republics was the same in 1959 and 1970, with the exception that the Kazakh republic ranked third in those years but by 1979 had been overtaken by the Uzbek republic. The four leaders are followed by Belorussia with around 9-1/2 million people in 1979. The remaining 10 republics are much smaller with 1979 populations ranging from Azerbaidzhan's 6 million down to the smallest republic, Estonia, with 1-1/2 million.

While ethnic Russians are of course most numerous in their own republic, they are also present in all other republics, in growing numbers for the most part, and in 1979 about 24 million of them were living outside the RSFSR. Only in the Transcaucasus has their absolute strength decreased. In Kazakhstan they are more numerous than the native ethnic peoples. Non-Russians also reside away from home

*Only a summary brochure has appeared for the 1979 census. The detailed volumes will not be available until the summer of 1981.

Table 1

POPULATION OF THE USSR, RUSSIANS AND OTHER ETHNIC GROUPS, 1959-1979
(Millions of People)

	Total Population			Indigenous Nominal Ethnic Groups Nationals in Own Republic			Russians in These Republics			Other Ethnic Groups in These Republics		
Republic	**1959**	**1970**	**1979**	**1959**	**1970**	**1979**	**1959**	**1970**	**1979**	**1959**	**1970**	**1979**
Slavic												
Russian (RSFSR)	117.53	130.08	137.55	97.86	107.75	113.52	(97.86)	(107.75)	(113.52)	19.67	22.33	24.03
Ukraine	41.87	47.12	49.76	32.16	35.28	36.49	7.09	9.13	10.47	2.62	2.71	2.80
Belorussian	8.06	9.00	9.56	6.53	7.29	7.57	0.66	0.94	1.13	0.87	0.77	0.86
Subtotal	167.46	186.20	196.89	136.55	150.32	157.58	105.61	117.82	125.12	23.16	25.81	27.69
Baltic												
Lithuanian	2.71	3.13	3.40	2.15	2.51	2.71	0.23	0.27	0.30	0.33	0.35	0.39
Latvian	2.09	2.36	2.52	1.30	1.34	1.34	0.56	0.70	0.82	0.23	0.32	0.36
Estonian	1.20	1.36	1.47	0.89	0.93	0.95	0.24	0.34	0.41	0.07	0.09	0.11
Subtotal	6.00	6.85	7.39	4.34	4.78	5.00	1.03	1.31	1.53	0.63	0.76	0.86
Transcaucasus												
Azerbaidzhan	3.70	5.12	6.03	2.49	3.78	4.71	0.50	0.51	0.48	0.71	0.83	0.84
Armenian	1.76	2.49	3.03	1.55	2.21	2.73	0.07	0.07	0.07	0.14	0.21	0.23
Georgian	4.04	4.69	5.01	2.60	3.13	3.43	0.41	0.40	0.37	1.03	1.16	1.21
Subtotal	9.50	12.30	14.07	6.64	9.12	10.87	0.98	0.98	0.92	1.88	2.20	2.28
Central Asia												
Uzbek	8.26	11.80	15.39	5.04	7.73	10.57	1.11	1.47	1.67	2.11	2.60	3.15
Kazakh	9.15	13.01	14.68	2.72	4.16	5.29	3.95	5.52	5.99	2.48	3.33	3.40
Tadzhik	1.98	2.90	3.80	1.05	1.63	2.24	0.26	0.34	0.40	0.67	0.93	1.16
Turkmenian	1.52	2.16	2.76	0.92	1.42	1.89	0.26	0.31	0.35	0.34	0.43	0.52
Kirgiz	2.07	2.93	3.53	0.84	1.29	1.69	0.62	0.86	0.91	0.61	0.78	0.93
Subtotal	22.98	32.80	40.16	10.57	16.23	21.68	6.20	8.50	9.32	6.21	8.07	9.16
Moldavia	2.89	3.57	3.95	1.89	2.30	2.53	0.29	0.41	0.51	0.71	0.86	0.91
Recapitulation												
RSFSR	117.53	130.08	137.55	97.86	107.75	113.52	97.86	107.75	113.52	19.67	22.33	24.03
All other Republics	91.30	111.64	124.89	62.13	75.00	84.14	16.25	21.27	23.88	12.92	15.37	16.87
USSR	208.83	241.72	262.44	159.99	182.75	197.66	114.11	129.02	137.40	32.59	37.70	40.90
USSR (double counting of Russians eliminated)	208.83	241.72	262.44	159.99	182.75	197.66	16.25	21.27	23.88	32.59	37.70	40.90

SOURCE: Soviet Censuses of 1959, 1970 and 1979.
Items may not add to totals due to rounding.
Line items of next to last row yield incorrect totals for USSR due to double-counting of Russians (a) as the nominal ethnic group in its own republic (RSFSR) and (b) as Russians in all republics. Last row line items add to correct totals for the USSR by elimination of the double-counting.

in republics other than their own--nearly 41 million of them in 1979, of whom about 24 million lived in the RSFSR. However it should be noted that approximately 21 million out of the 41 million do not have republics bearing their ethnic names, i.e., the Tatars, Poles, Jews, Germans, Mordvins, and a host of other ethnic groups, many of them quite few in total numbers.*

The composition of the population and the trends between 1959 and 1979 are clarified in Table 2. The data are grouped by geographic area showing numbers of people (Indigenous Nominal Ethnic Group, Russians, and others) in each, their average annual rates of increase, the percentages represented by each of these three classes of people within their own area, and as a share of the total Soviet population.

Several interesting facts emerge from an examination of Table 2. Between the 1959-1970 period and the 1970-1979 period the rates of population growth fell for the Soviet Union as a whole and for each geographic area, including the Central Asian republics. The national rate of increase fell from 1.34 in the first period to 0.92 percent in the second.† The growth rates of ethnic Russians were below those of non-Russians in both periods and fell from 70 percent of the latter in the first period to 60 percent in the second. Thus the Russians have not been reproducing themselves as rapidly as non-Russians and in the years 1970-1979 did still less well in this respect than they did in the years 1959-1970. Since Russians now comprise only slightly over 52 percent of total Soviet population, they will be outnumbered by non-Russian ethnic groups in the foreseeable future if present trends continue. It is worth noting that Russians in the 14 republics outside the RSFSR increased in numbers more than twice as fast as Russians in their own republic in both inter-censal periods. This is doubtless due in part to emigration from the RSFSR to other republics. During the years 1970-1979 Russians outside the RSFSR increased

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*As noted previously, some of these groups (Tartars, Bashkirs, Chuvash, etc.) have their own Autonomous Republics or other subdivisions.

†In the United States, population grew at an annual rate of 1.43 percent between 1959 and 1970 and at an annual rate of 0.84 percent between 1970 and 1979.

Table 2

NUMBERS OF PEOPLE BY GEOGRAPHIC AREA, GROWTH RATES, AND PERCENTAGE DISTRIBUTION, 1959-1979

	Millions of People			Annual % Increase		Percent Within Group			Percent of USSR		
Geographic Area	1959	1970	1979	1959-1970	1970-1979	1959	1970	1979	1959	1970	1979
RSFSR	117.53	130.08	137.55	0.93	0.62	100.00	100.00	100.00	56.27	53.81	52.41
Nom. Eth. Gp.(Russians)*	97.86	107.75	113.52	0.88	0.58	83.26	82.83	82.53	46.86	44.58	43.26
Others	19.67	22.33	24.03	1.16	0.82	16.74	17.17	17.47	9.42	9.24	9.16
Ukraine + Belorussia	49.93	56.12	59.32	1.07	0.62	100.00	100.00	100.00	23.91	23.22	22.60
Nom. Eth. Gp.	38.69	42.57	44.06	0.87	0.38	77.49	75.86	74.28	18.53	17.62	16.78
Russians	7.75	10.07	11.60	2.41	1.58	15.52	17.94	19.55	3.72	4.17	4.42
Others	3.49	3.48	3.66	-0.03	0.56	6.99	6.20	6.17	1.67	1.44	1.40
Baltic Republics	6.00	6.85	7.39	1.21	0.85	100.00	100.00	100.00	2.87	2.83	2.82
Nom. Eth. Gp.	4.34	4.78	5.00	0.88	0.50	72.33	69.78	67.66	2.08	1.98	1.90
Russians	1.03	1.31	1.53	2.21	1.74	17.17	19.12	20.70	0.49	0.54	0.58
Others	0.63	0.76	0.86	1.72	1.38	10.50	11.10	11.64	0.30	0.31	0.33
Transcaucasian Republics	9.50	12.30	14.07	2.38	1.51	100.00	100.00	100.00	4.54	5.09	5.36
Nom. Eth. Gp.	6.64	9.12	10.87	2.93	1.96	69.89	74.15	77.26	3.18	3.77	4.14
Russians	0.98	0.98	0.92	0.00	-0.70	10.32	7.97	6.54	0.47	0.41	0.35
Others	1.88	2.20	2.28	1.44	0.40	19.79	17.89	16.20	0.90	0.91	0.87
Central Asian Republics	22.98	32.80	40.16	3.29	2.28	100.00	100.00	100.00	11.00	13.57	15.30
Nom. Eth. Gp.	10.57	16.23	21.68	3.98	3.26	45.00	49.48	53.98	5.06	6.71	8.26
Russians	6.20	8.50	9.32	2.91	1.03	26.98	25.91	23.21	2.97	3.52	3.55
Others	6.21	8.07	9.16	2.41	1.42	27.02	24.60	22.81	2.97	3.34	3.49
Moldavia	2.89	3.57	3.95	1.94	1.13	100.00	100.00	100.00	1.38	1.48	1.51
Nom. Eth. Gp.	1.89	2.30	2.53	1.80	1.06	65.40	64.43	64.05	0.91	0.95	0.96
Russians	0.29	0.41	0.51	3.20	2.45	10.03	11.48	12.91	0.14	0.17	0.19
Others	0.71	0.86	0.91	1.76	0.53	24.57	24.09	23.04	0.34	0.36	0.35
USSR	208.83	241.72	262.44	1.34	0.92	100.00	100.00	100.00	100.00	100.00	100.00
Nom. Eth. Gp.	159.99	182.75	197.66	1.22	0.88	76.61	75.60	75.32			
Russians in RSFSR	97.86	107.75	113.52	0.88	0.58	46.86	44.58	43.26			
Nom. Eth. Gp.-Own Rep.	62.13	75.00	84.14	1.73	1.29	29.75	31.02	32.06	Same as previous three columns on the left		
Others	48.84	58.97	64.78	1.73	1.05	23.39	24.40	24.68			
Russians Outside RSFSR	16.25	21.27	23.88	2.48	1.29	7.78	8.80	9.10			
Non-Russians not in Own Republic	32.59	37.70	40.90	1.33	0.91	15.61	15.60	15.58			
All Russians	114.11	129.02	137.40	1.12	0.70	100.00	100.00	100.00	54.64	53.38	52.35
In Own Republic	97.86	107.75	113.52	0.88	0.58	85.76	83.5	82.62	46.86	44.58	43.25
Elsewhere	16.25	21.27	23.88	2.48	1.29	14.24	16.5	17.38	7.78	8.80	9.10
All Non-Russians	94.72	112.70	125.04	1.59	1.16	100.00	100.00	100.00	45.36	46.62	47.65
In Own Republic	62.13	75.00	84.14	1.73	1.29	65.60	66.50	67.29	29.75	31.03	32.06
Elsewhere	32.59	37.70	40.90	1.33	0.91	34.40	33.50	32.71	15.61	15.59	15.58

*Nominal Indigenous Ethnic Group.

at an annual rate of 1.29 percent--exactly the same average growth rate experienced by all nominal non-Russian ethnic groups in their home republics.

The highest growth rates, by far, in both the 1959-1970 and the 1970-1979 periods were exhibited by the Turkic-Muslim peoples of Central Asia. From 1959 to 1970 the nominal ethnic groups of the Central Asian republics increased at 3.98 percent per year and from 1970 to 1979 at 3.26 percent per year, or at about 3 times the national rate of the USSR in the first period and at 3-1/2 times the national rate in the second. They also outproduced Russians and other non-native ethnic groups residing in the Central Asian republics, and made notable gains in their shares of their own republics' totals. Other areas experiencing faster growth rates than the USSR as a whole were the Transcaucasian republics and Moldavia. In the Transcaucasus the native peoples increased their number faster than the non-natives while the Russians actually declined in strength from 1970 to 1979 after having just barely maintained themselves between 1959 and 1970. Among the losers, other than the RSFSR, in the growth race were the Ukrainian, Belorussian, and the Baltic republics, all of which grew at rates below the Soviet national average in both periods. This was true in spite of substantial gains in the numbers of ethnic Russians and other non-indigenous people residing in these republics since the native ethnic groups scarcely increased at all, except in Lithuania.

The following overall trends emerge. Russians are losing in relative strength in their own republic, in the Transcaucasus, Central Asia, and in the USSR as a whole, but are gaining relatively in the Ukraine, Belorussia, Moldavia, and the tiny Baltic republics. Russian gains in the latter areas outweigh losses in the other non-Russian republics so that in toto Russians have experienced gains in all non-Russian republics taken together--their numbers as shares in the Soviet total have risen from 7.8 percent in 1959 to 9.1 percent in 1979. Indigenous ethnic groups of the Baltics, the Ukraine, and Belorussia have lost ground in their homelands and in their proportions of total Soviet population. Elsewhere, and particularly in the Central Asian republics, indigenous ethnic groups have gained relatively, in their

homelands and in their percentages of the total population of the USSR.

We turn now to a closer look at the ethnic characteristics of the Soviet population by considering both the Russian and the major non-Russian groups individually.

IV. POPULATION BY MAJOR ETHNIC GROUP

We first examine the numbers of people in the major ethnic groups irrespective of their location within the Soviet Union--that is, whether or not they dwell within their constituent republics, if any. As already noted, several groups with substantial numbers of people do not have a constituent republic bearing their names. Table 3 contains the data.

It is apparent that the Muslim-Turkic peoples, wherever located, have been growing in numbers faster than any other group, at about 2.4 times the national rate from 1959 to 1970 and at about 2.6 times the national rate between 1970 and 1979. Among the larger groups of Muslim-Turkic people the Uzbek, Kirgiz, Tadzhik, and Turkmen have experienced outstanding growth rates, above 3 percent annually in both inter-censal periods. The Slavic and Baltic peoples had growth rates well below the Soviet average in these periods, particularly in the second. Lower than national growth rates were also shared by Germans, Mordvins, Poles, and Jews, with the latter three actually declining in numbers. In the case of the Jews, Germans, and Poles, emigration and perhaps assimilation explain part of the decline.

Virtually every major ethnic group gained population at a slower rate between 1970 and 1979 than it did between 1959 and 1970. This was most noticeable among the Balts and the Slavs. Their growth rates in the second period were less than 60 percent of those in the first. For Muslim-Turkic people and "All Other People" (Armenians, Georgians, etc., comprising less than 10 percent of the USSR's total population), the growth rates in the second period were about 74 percent of those in the first. Among the Muslim-Turkic group the Uzbeks, Turkmen, Kirgiz, and Tadzhiks exhibited 1970-1979 growth rates from 84 percent to 87 percent of those from 1959-1970, while the Azeris and Kazakhs did less well.

As a result of the varying growth rates among the various ethnic groups, changes occurred in their shares of the total population of the Soviet Union. From 1959 through 1979 the Balts, the Slavs, and All Other People steadily lost ground, while the Muslim-Turkic people

Table 3

SOVIET POPULATION BY MAJOR ETHNIC GROUPS, 1959-1979

Ethnic Group	Millions of People			Annual % Increase		Ratio to National Percent of Increase		Percent of Total SU Population		
	1959	1970	1979	1959-1970	1970-1979	1959-1970	1970-1979	1959	1970	1979
Baltic People	4.72	5.11	5.31	0.72	0.43	0.54	0.46	2.26	2.11	2.02
Estonians	0.99	1.01	1.02	0.18	0.11	0.13	0.12	0.47	0.42	0.39
Latvians	1.40	1.43	1.44	0.19	0.08	0.14	0.09	0.67	0.59	0.55
Lithuanians	2.33	2.67	2.85	1.25	0.73	0.93	0.79	1.11	1.10	1.09
Slavic People	159.27	178.82	189.21	1.06	0.62	0.79	0.67	76.27	73.98	72.10
Russians	114.11	129.02	137.40	1.12	0.70	0.84	0.76	54.64	53.38	52.35
Belorussians	7.91	9.05	9.46	1.23	0.49	0.92	0.53	3.79	3.74	3.61
Ukrainians	37.25	40.75	42.35	0.82	0.43	0.61	0.47	17.84	15.86	16.14
Muslem-Turkic People	26.21	37.02	45.72	3.19	2.37	2.38	2.58	12.55	15.32	17.42
Adygeis	0.08	0.10	0.11	2.05	1.06	1.53	1.15	0.04	0.04	0.04
Azeris	2.94	4.38	5.48	3.69	2.52	2.75	2.74	1.41	1.81	2.09
Bashkirs	0.99	1.24	1.37	2.07	1.11	1.54	1.21	0.47	0.51	0.52
Chechens	0.42	0.61	0.76	3.45	2.47	2.57	2.68	0.20	0.25	0.29
Chuvash	1.47	1.69	1.75	1.28	0.39	0.96	0.42	0.70	0.70	0.67
Dagestani	0.67	1.12	1.37	4.78	2.26	3.57	2.46	0.32	0.46	0.52
Gagavzi	0.12	0.16	0.17	2.65	0.68	1.98	0.74	0.06	0.07	0.06
Ingush	0.11	0.16	0.19	3.46	1.93	2.58	2.10	0.05	0.07	0.07
Kabardian	0.20	0.28	0.32	3.11	1.49	2.32	1.62	0.10	0.12	0.12
Karakalpaks	0.17	0.24	0.30	3.18	2.51	2.37	2.73	0.08	0.10	0.11
Karachay	0.08	0.11	0.13	2.94	1.87	2.19	2.03	0.04	0.05	0.05
Kazakhs	3.62	5.30	6.56	3.51	2.40	2.63	2.61	1.73	2.19	2.50
Kirgiz	0.97	1.45	1.91	3.72	3.11	2.78	3.38	0.46	0.60	0.73
Kumyks	0.14	0.19	0.23	2.82	2.15	2.10	2.34	0.07	0.08	0.09
Kurds	0.06	0.09	0.13	3.75	4.17	2.80	4.53	0.03	0.04	0.05
Tadzhiks	1.40	2.14	2.90	3.93	3.43	2.93	3.73	0.67	0.88	1.11
Tatars	4.97	5.93	6.32	1.62	0.71	1.21	0.77	2.38	2.45	2.41
Turkmen	1.00	1.51	2.03	3.88	3.27	2.90	3.55	0.48	0.63	0.77
Uzbeks	6.02	9.20	12.46	3.91	3.43	2.93	3.73	2.88	3.80	4.75
Others	0.78	1.10	1.23	3.17	1.25	2.37	1.36	0.37	0.46	0.47
All Other People	18.63	20.77	22.20	0.99	0.74	0.74	0.80	8.92	8.60	8.46
Armenians	2.79	3.56	4.15	2.24	1.72	1.67	1.86	1.33	1.47	1.58
Georgians	2.69	3.24	3.57	1.71	1.08	1.28	1.17	1.29	1.34	1.36
Germans	1.62	1.85	1.94	1.21	0.53	0.90	0.58	0.76	0.76	0.74
Jews	2.26	2.15	1.81	-0.45	-1.89	-0.34	-2.05	1.08	0.89	0.69
Moldavians	2.21	2.70	2.97	1.84	1.06	1.37	1.15	1.06	1.12	1.13
Mordvins	1.28	1.26	1.19	-0.14	-0.63	-0.10	-0.68	0.61	0.52	0.45
Poles	1.38	1.17	1.15	-1.49	-0.19	-1.11	-0.21	0.66	0.48	0.44
Others	4.40	4.84	5.42	0.87	1.26	0.65	1.36	2.11	2.00	2.06
USSR	208.83	241.72	262.44	1.34	0.92	1.00	1.00	100.00	100.00	100.00

made steady and significant gains. Their percentage of the Soviet total rose from 12.6 percent in 1959 to 17.4 percent in 1979 while that of the Slavs declined from 76.3 percent in 1959 to 72.1 percent in 1970. Among individual ethnic groups (as of January 1979), Russians ranked first with 52.4 percent of the total population of the USSR, followed by Ukrainians (16.1 percent), Uzbeks (4.8 percent), Belorussians (3.6 percent), Kazakhs (2.5 percent), Tatars (2.4 percent), and Azeris (2.1 percent). No other group accounted for as much as 2 percent.

It is interesting that throughout the USSR, ethnic groups having their own constituent republics, except the Slavs, tend more and more to live within their frontiers. Table 4 shows the details. This is especially and increasingly true of Baltic peoples, 94 percent of whom now live within their republics. Lower percentages of Slavs (except Ukrainians) reside at home and the proportions of those doing so declined from 85.7 percent in 1959 to 83.3 percent in 1979. For Russians the percentages declined from 85.7 percent in 1959 to 82.6 percent in 1979, a reflection of migration from the RSFSR to the Baltics and Central Asia. In the republics of the Transcaucasus and Central Asia, increasingly their native ethnic groups are living at home. Furthermore, most of the Central Asians living outside their home republics reside in neighboring Central Asian Republics. Thus 16.1 percent of Central Asians live elsewhere than in home republics, but 13.3 percent live in other Central Asian republics and only 2.8 percent live outside of Central Asia. The Kazakh republic is the only one of this group that departs somewhat from the Central Asian pattern, as 19.4 percent of all Kazakhs live outside Kazakhstan and 8.2 percent live outside Central Asia--almost all in the RSFSR.

Table 4

DISTRIBUTION OF ETHNIC GROUPS WITH OWN REPUBLICS, 1959-1970
(Millions of People)

	Total in USSR			In Own Republics			Elsewhere			Percent at Home			Percent Elsewhere		
	1959	1970	1979	1959	1970	1979	1959	1970	1979	1959	1970	1979	1959	1970	1979
Baltic People	4.72	5.11	5.31	4.34	4.78	5.00	0.38	0.33	0.31	92.0	93.5	94.2	8.0	6.5	5.8
Estonians	0.99	1.01	1.02	0.89	0.93	0.95	0.10	0.08	0.07	89.9	92.1	93.1	11.1	7.9	6.9
Latvians	1.40	1.43	1.44	1.30	1.34	1.34	0.10	0.09	0.10	92.9	93.7	93.1	7.1	6.3	6.9
Lithuanians	2.33	2.67	2.85	2.15	2.51	2.71	0.18	0.16	0.14	92.3	94.0	95.1	7.7	6.0	4.9
Slavic People	159.27	178.82	189.21	136.55	150.30	157.58	22.72	28.50	31.63	85.7	84.1	83.3	14.3	15.9	16.7
Russians	114.11	129.02	137.40	97.86	107.75	113.52	16.25	21.27	23.88	85.8	83.5	82.6	14.2	16.5	17.4
Belorussians	7.91	9.05	9.46	6.53	7.29	7.57	1.38	1.76	1.89	82.6	80.6	80.0	17.4	19.4	20.0
Ukrainians	37.25	40.75	42.35	32.16	35.28	36.49	5.09	5.47	5.86	86.3	86.6	86.2	13.7	13.3	13.8
Transcaucasians	8.42	11.18	13.20	6.64	9.12	10.87	1.78	2.06	2.33	78.9	81.6	82.4	21.1	18.4	17.6
Azeris	2.94	4.38	5.48	2.49	3.78	4.71	0.45	0.60	0.77	84.7	86.3	85.9	15.3	13.7	14.1
Armenians	2.79	3.56	4.15	1.55	2.21	2.73	1.24	1.35	1.42	79.2	62.1	65.8	20.8	37.9	34.2
Georgians	2.69	3.24	3.57	2.60	3.13	3.43	0.09	0.11	0.14	96.7	96.6	96.1	3.3	3.4	3.9
Central Asians	13.01	19.61	25.86	10.57	16.23	21.68	2.44	3.38	4.18	81.2	82.8	83.8	18.8	17.2	16.2
Uzbeks	6.02	9.20	12.46	5.04	7.73	10.57	0.98	1.47	1.89	83.7	84.0	84.8	16.3	16.0	15.2
Kazakhs	3.62	5.30	6.56	2.72	4.16	5.29	0.90	1.14	1.27	75.1	78.5	80.6	24.9	21.5	19.4
Tadzhiks	1.40	2.14	2.90	1.05	1.63	2.24	0.35	0.51	0.66	75.0	76.2	77.2	25.0	23.8	22.8
Turkmen	1.00	1.52	2.03	0.92	1.42	1.89	0.08	0.10	0.14	92.0	93.4	93.1	18.0	6.6	6.9
Kirgiz	0.97	1.45	1.91	0.84	1.29	1.69	0.13	0.16	0.22	86.6	89.0	88.5	13.4	11.0	11.5
Moldavians	2.21	2.70	2.97	1.89	2.30	2.53	0.32	0.40	0.44	85.5	85.2	85.2	14.5	14.8	14.8
Subtotal	187.63	217.42	236.55	159.99	182.75	197.66	27.64	34.67	38.89	85.3	84.0	83.6	14.7	16.0	16.4
People Without Republics	21.20	24.30	25.89	0	0	0	21.20	24.30	25.89	0	0	0	100.0	100.0	100.0
USSR	208.83	241.72	262.44	159.99	182.75	197.66	48.84	58.97	64.78						

V. PROJECTIONS OF POPULATION AND DRAFT AGE MALES TO 1995 BY ETHNIC GROUP

1. THE DATA BASE

The data base employed consists of (a) the Soviet censuses of 1959, 1970, and 1979, and (b) *Population Projections by Age and Sex for the Republics and Major Economic Regions of the USSR, 1970 to 2000*, by Godfrey S. Baldwin, Foreign Demographic Analysis Division, U.S. Bureau of the Census (International Population Reports, Series P-91, No. 26), September 1979. The latter source provides valuable projections through the year 2000 of Soviet population by constituent republic and major economic region. The estimates are broken down at five-year intervals from 1970 through 2000 by age and sex groups. Four different sets of projections--high, medium, low, and constant (based on alternative fertility and mortality assumptions)--are included. The cohort-component method, with the 1970 population as the base, was employed.* The Bureau's volume contains a massive amount of useful information. However, it does not contain, and the Bureau does not publish, estimates by ethnic group and apparently has never done so. Furthermore, no such estimates are available from Soviet sources, or indeed from any source, to the best of our knowledge. In addition, only fragmentary bits of information are available concerning fertility and mortality rates by ethnic group. Faced with such lacunae, the cohort-component method cannot be used to derive ethnic projections and we have to resort to methods of estimation such as those described below.

2. METHODOLOGICAL CONSIDERATIONS

A simpleminded approach, which we have tested, consists of using the 1970-1979 population trends experienced by the USSR among its ethnic groups, or other arbitrarily assumed rates, as the means for projection.

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*This method consists of "carrying forward a reported or estimated age-sex distribution on the basis of various assumptions concerning the components of population change (i.e., births, deaths, and migration)." See Baldwin, cited above.

A difficulty arises in that the various groups grow at different rates in each republic, and in each republic the rates of growth differ among the ethnic groups. It would probably be logical to use for each group a growth rate associated with the one actually experienced in the republic of residence. After making estimates of the future populations of each ethnic group, it is necessary to determine what numbers of draft age males each will include. The United States Bureau of the Census publication provides age-tree data *by republic*, 1970-2000, and included in the distribution is the age group of 15-19-year olds, by sex. From this one can derive the numbers of 18-year-old males--those which by Soviet law are subject to induction--by dividing by five. The division by five is justifiable because there are only miniscule differences in mortality rates among those of each single year of age. But here one has a choice between two alternatives: (a) to apply to the projection of each ethnic group's population the age-tree for that group's home republic, i.e., that of the Ukrainian SSR for Ukrainians in all republics in which they live, or (b) to apply the age-trees of each republic of residence to each ethnic group residing within it, i.e., the Ukrainian age-tree to Russians, to Moldavians, to Belorussians, etc., residing in the Ukraine. Both ways of proceeding are bound to be inaccurate. The answers derived from this sort of method are unsatisfactory and indicate that the use of another means of estimation is desirable.

Since all males becoming 18 years of age between 1980 and 1995 are alive today, a different method of estimating their numbers might seem feasible for this period. It would involve estimating the numbers of males born between January 1962 and January 1977 in each ethnic group and allowing for mortality between their natal dates and the times at which they become 18 years of age. We know the total numbers of people in each ethnic group in 1959, 1970, and 1979, and could by interpolation estimate their numbers in the years 1962 to 1977. However, we do not know the male-female ratios in each ethnic group nor do we have information on their age distribution. Use of republic age-trees runs into the same difficulties as in the first method discussed.

Several other methods might be devised which also suffer from basic informational infirmities such as those noted above. Therefore

we have formulated a method which depends on the relatively firm information of the Soviet census and of the FDAD publication mentioned previously. The underlying rationale rests on the notion that the structure and dynamics of a population are such that its growth characteristics in a given period shape and constrain its growth and age composition at a near-future period. A faster growth in a given population at time A will lead to a faster growth at time B relative to another population which increased less rapidly at time A. Further, a more rapid population growth at time A will lead to a population with relatively larger percentages of young people at time B than will be the case with a less rapid growth at time A. Accordingly, we have developed two sets of simple linear regression equations: (a) for estimating near-future rates of total population growth from those experienced in the past, and (b) for estimating the percentages of young (15 to 19-year-old) males in the near-future populations from the observed rates of total population growth in the past.

We know from the Soviet census material the total numbers of people in each ethnic group in each constituent republic in 1959, 1970, and 1979. From these data we have calculated the annual growth rates in the total population of *each group* in each republic between 1959 and 1970, and between 1970 and 1979. We also know the annual growth rates in these two periods of the *total* population of each republic. From the FDAD publication we have very good estimates of the numbers of people by sex in each of 16 different age groups including one 15 to 19 years of age. From these we calculated the percentages of 15 to 19-year-old males in the estimated total populations (medium series) of each republic for 1979, 1985, 1990, and 1995. We then proceeded to develop the simple regression equations relating (a) the growth rates in the total populations of the republics, 1959-1970 and 1970-1979, to their estimated growth rates (FDAD medium series) 1979-1985, 1985-1990, and 1990-1995, and (b) the growth rates in the total populations of the republics, 1959-1970 and 1970-1979, to the percentages of their total populations comprised by 18-year-old males in 1979, 1985, 1990, and 1995. We then used these regression equations expressing the generic relationships we have between known population

growth in the past and estimated population growth in the future, and known population growth in the past to estimated future percentages of 15 to 19-year-old males in the total estimated future populations to derive estimates by ethnic group. The equations, standard errors of estimate, values of r and R^2, F ratios, and confidence limits for r and b appear in the Appendix. By applying the derived percentages of 15 to 19-year-old males in the total population to the estimated future populations by ethnic group, we obtained the estimated numbers of such males for each group. These results were simply divided by 5 to secure the numbers of 18-year-old males, since, as noted previously, the differences in mortality rates by single years of age within this group are very small.

3. THE RESULTS

The equations can be applied in various ways: (a) to each ethnic group in each republic in which it resides, (b) to the entirety of each group in the Soviet Union, ignoring location, (c) to combinations of groups, *i.e.*, *Slavs*, *Balts*, *Muslim-Turkic* people, etc., (d) to the populations of republics or other geographic areas, or (e) to the population of the USSR as a whole. The results of the calculations for Cases A, B, and C appear in Tables 5, 6, and 7, in which each of the figures for 1980 was obtained by interpolation between 1979 and 1985. Summary data for the entire USSR, including Cases D and E, appear in Table 8, which compares our results with those of the United States Bureau of the Census on a national basis. Since population growth rates differ so materially for each ethnic group in each republic, we believe that the application of the equations to each group in each republic yields the best estimates of future population. Using Table 5 (Case A) as the basis, the following facts of interest emerge:

- Ethnic Russians now (1980) appear to comprise less than half the 18-year-old male cohort and by 1995 will comprise about 46 percent of the total.
- The percentage of ethnic Russians and their fellow Slavs (Ukrainians and Belorussians) taken together will fall

Table 5--Case A

ESTIMATED TOTAL SOVIET POPULATION, NUMBERS OF 15 TO 19-YEAR-OLD MALES AND 18-YEAR-OLD MALES 1979-1995, BY MAJOR ETHNIC GROUP[a]
(Millions of People)

Major Ethnic Group	Total Population					Number of 15 to 19-Year-Old Males					Number of 18-Year-Old Males				
	1979	1980	1985	1990	1995	1979	1980	1985	1990	1995	1979	1980	1985	1990	1995
Total Slavs	189.21	190.20	195.50	200.10	204.67	8.193	7.980	6.912	6.808	7.139	1.639	1.596	1.382	1.362	1.428
Russians	137.40	138.24	142.44	146.33	150.13	6.022	5.870	5.112	5.075	5.319	1.204	1.174	1.022	1.015	1.064
Ukrainians	42.35	42.42	43.20	43.76	44.37	1.748	1.697	1.438	1.405	1.477	0.350	0.339	0.288	0.281	0.295
Belorussians	9.46	9.54	9.86	10.01	10.17	0.423	0.413	0.362	0.328	0.343	0.085	0.083	0.072	0.066	0.069
Baltic Peoples	5.31	5.32	5.37	5.44	5.51	0.214	0.207	0.173	0.174	0.182	0.043	0.041	0.035	0.035	0.036
Muslim-Turkic	45.72	46.96	53.07	59.70	66.36	2.813	2.806	2.810	3.193	3.353	0.563	0.561	0.560	0.638	0.670
Azeris	5.48	5.64	6.45	7.26	8.08	0.351	0.352	0.355	0.384	0.401	0.070	0.070	0.071	0.077	0.080
Bashkirs	1.37	1.39	1.49	1.56	1.63	0.070	0.069	0.063	0.060	0.062	0.014	0.014	0.013	0.012	0.012
Chuvash	1.75	1.76	1.82	1.84	1.86	0.078	0.076	0.066	0.058	0.061	0.016	0.015	0.013	0.012	0.012
Daghestanis	1.66	1.71	1.93	2.13	2.33	0.102	0.102	0.101	0.104	0.108	0.020	0.020	0.020	0.021	0.022
Kazakhs	6.56	6.76	7.78	8.72	9.64	0.422	0.420	0.405	0.452	0.471	0.084	0.084	0.087	0.090	0.094
Kirghiz	1.91	1.97	2.26	2.61	2.98	0.123	0.123	0.125	0.152	0.160	0.025	0.025	0.025	0.030	0.032
Tadzhiks	2.90	3.00	3.47	4.09	4.72	0.193	0.201	0.240	0.296	0.309	0.039	0.040	0.040	0.059	0.062
Tatars	6.32	6.38	6.70	6.90	7.07	0.301	0.295	0.264	0.242	0.251	0.060	0.059	0.053	0.048	0.050
Turkmen	2.03	2.10	2.42	2.83	3.24	0.133	0.133	0.136	0.170	0.188	0.027	0.027	0.027	0.034	0.038
Uzbeks	12.46	12.87	14.89	17.57	20.30	0.823	0.826	0.845	1.084	1.145	0.165	0.165	0.169	0.217	0.229
Others	3.28	3.38	3.86	4.19	4.51	0.209	0.209	0.210	0.191	0.197	0.042	0.042	0.042	0.038	0.039
All Other People	22.20	22.35	23.21	23.96	24.78	0.976	0.963	0.862	0.862	0.909	0.194	0.193	0.174	0.172	0.182
Armenians	4.15	4.22	4.60	5.01	5.42	0.202	0.203	0.211	0.232	0.242	0.041	0.041	0.042	0.046	0.048
Georgians	3.57	3.61	3.80	3.99	4.16	0.172	0.175	0.151	0.153	0.159	0.034	0.035	0.030	0.031	0.032
Germans	1.94	1.95	2.01	2.05	2.08	0.086	0.084	0.072	0.067	0.071	0.017	0.017	0.015	0.013	0.014
Jews	1.81	1.79	1.73	1.56	1.45	0.057	0.054	0.040	0.016	0.024	0.011	0.011	0.008	0.003	0.005
Moldavians	2.97	3.01	3.20	3.34	3.49	0.147	0.145	0.132	0.128	0.133	0.029	0.029	0.026	0.026	0.027
Mordvins	1.19	1.18	1.15	1.10	1.07	0.040	0.038	0.030	0.024	0.027	0.008	0.008	0.006	0.005	0.005
Poles	1.15	1.13	1.05	1.03	1.02	0.027	0.025	0.016	0.026	0.028	0.005	0.005	0.005	0.005	0.006
Others	5.42	5.46	5.67	5.88	6.09	0.245	0.239	0.210	0.216	0.225	0.049	0.048	0.042	0.043	0.045
USSR Total	262.44	264.83	277.15	289.20	301.32	12.196	11.956	10.757	11.037	11.583	2.439	2.392	2.151	2.207	2.316

[a]Calculations based on application of equations to each ethnic group in each republic in which it resides. Totals are summations of the components, and were not individually calculated.

	Percentages of Soviet Totals														
Total Slavs	72.1	71.8	70.5	69.2	67.9	67.2	66.7	64.3	61.7	61.6	67.2	66.7	64.3	61.7	61.6
Russians	52.4	52.2	51.4	50.6	49.8	49.4	49.1	47.5	46.0	45.9	49.4	49.1	47.5	46.0	45.9
Ukrainians	16.1	16.0	15.6	15.1	14.7	14.3	14.2	13.4	12.7	12.7	14.3	14.2	13.4	12.7	12.7
Belorussians	3.6	3.6	3.5	3.5	3.4	3.5	3.4	3.4	3.0	3.0	3.5	3.4	3.4	3.0	3.0
Baltic Peoples	2.0	2.0	1.9	1.9	1.8	1.7	1.7	1.6	1.6	1.6	1.7	1.7	1.6	1.6	1.6
Muslim-Turkic	17.4	17.7	19.2	20.6	22.0	23.1	23.5	26.1	28.9	29.0	23.1	23.5	26.1	28.9	28.9
All Other People	8.5	8.4	8.4	8.3	8.2	8.0	8.1	8.0	7.8	7.9	8.0	8.1	8.0	7.8	8.0
USSR Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Items may not add to totals due to rounding

Table 6--Case B

ESTIMATED TOTAL SOVIET POPULATION, NUMBERS OF 15 TO 19-YEAR-OLD MALES AND 18-YEAR-OLD MALES 1979-1995, BY MAJOR ETHNIC GROUP[a]
(Millions of People)

Ethnic Group	Total Population					Number of 15 to 19-Year-Old Males					Number of 18-Year-Old Males				
	1979	1980	1985	1990	1995	1979	1980	1985	1990	1995	1979	1980	1985	1990	1995
Total Slavs	189.21	190.16	194.81	199.18	203.45	8.137	7.913	6.785	6.739	7.053	1.627	1.583	1.357	1.348	1.411
Russians	137.40	138.14	141.91	145.64	149.24	5.977	5.816	5.009	5.025	5.253	1.195	1.163	1.002	1.005	1.051
Ukrainians	42.35	42.49	43.07	43.59	44.13	1.741	1.688	1.421	1.391	1.461	0.348	0.338	0.284	0.278	0.092
Belorussians	9.46	9.53	9.83	9.95	10.08	0.419	0.409	0.355	0.323	0.339	0.084	0.082	0.071	0.065	0.068
Baltic Peoples	5.31	5.32	5.37	5.44	5.51	0.214	0.207	0.173	0.174	0.182	0.043	0.042	0.035	0.035	0.036
Muslim-Turkic Peoples	45.72	46.92	52.85	59.42	66.03	2.789	2.783	2.763	3.125	3.272	0.557	0.556	0.553	0.625	0.655
Azeris	5.48	5.64	6.45	7.26	8.06	0.351	0.351	0.353	0.381	0.397	0.070	0.070	0.071	0.076	0.079
Bashkirs	1.37	1.39	1.49	1.56	1.63	0.070	0.069	0.062	0.060	0.062	0.014	0.014	0.013	0.012	0.012
Chuvash	1.75	1.75	1.72	1.74	1.76	0.078	0.075	0.063	0.055	0.058	0.016	0.015	0.013	0.011	0.012
Daghestani	1.66	1.71	1.93	2.19	2.44	0.102	0.102	0.101	0.105	0.109	0.020	0.020	0.020	0.021	0.022
Kazakhs	6.56	6.75	7.67	8.58	9.48	0.411	0.411	0.411	0.441	0.458	0.082	0.082	0.082	0.088	0.092
Kirghiz	1.91	1.97	2.26	2.62	2.98	0.123	0.123	0.125	0.153	0.160	0.025	0.025	0.025	0.031	0.032
Tadzhiks	2.90	2.99	3.46	4.08	4.71	0.191	0.191	0.196	0.251	0.265	0.038	0.038	0.039	0.050	0.053
Tatars	6.32	6.38	6.70	6.88	7.05	0.300	0.294	0.262	0.238	0.249	0.060	0.059	0.052	0.048	0.050
Turkmen	2.03	2.10	2.42	2.83	3.25	0.133	0.133	0.135	0.170	0.179	0.026	0.026	0.027	0.034	0.036
Uzbeks	12.46	12.87	14.89	17.54	20.25	0.821	0.825	0.844	1.080	1.138	0.164	0.165	0.164	0.216	0.228
Others	3.28	3.37	3.86	4.19	4.51	0.209	0.209	0.210	0.191	0.197	0.042	0.042	0.042	0.038	0.039
All Other People	22.20	22.35	23.06	23.86	24.68	0.968	0.939	0.806	0.867	0.909	0.192	0.188	0.160	0.173	0.182
Armenians	4.15	4.23	4.60	4.97	5.33	0.217	0.214	0.201	0.222	0.229	0.043	0.043	0.040	0.044	0.046
Georgians	3.57	3.61	3.80	3.98	4.14	0.172	0.165	0.131	0.152	0.158	0.034	0.033	0.026	0.030	0.032
Germans	1.94	1.95	2.01	2.05	2.09	0.086	0.084	0.072	0.067	0.071	0.017	0.016	0.104	0.013	0.014
Jews	1.81	1.79	1.72	1.54	1.41	0.056	0.053	0.040	0.014	0.021	0.011	0.011	0.008	0.003	0.004
Moldavians	2.97	3.01	3.20	3.35	3.49	0.146	0.143	0.131	0.128	0.133	0.029	0.029	0.026	0.026	0.027
Mordvins	1.19	1.19	1.15	1.10	1.06	0.040	0.038	0.030	0.024	0.026	0.008	0.008	0.006	0.005	0.005
Poles	1.15	1.13	1.05	1.03	1.03	0.026	0.024	0.016	0.026	0.029	0.005	0.004	0.003	0.005	0.006
Others	5.42	5.44	5.53	5.84	6.13	0.225	0.218	0.185	0.234	0.242	0.045	0.044	0.037	0.047	0.048
USSR Total	262.44	264.75	276.09	287.90	299.67	12.108	11.842	10.527	10.905	11.416	2.419	2.369	2.105	2.181	2.284

[a] Calculations based on application of equations to the entirety of each ethnic group in the USSR. Totals are summations of the components, and were not individually calculated.

Table 7--Case C

ESTIMATED TOTAL SOVIET POPULATION, NUMBERS OF 15 TO 19-YEAR-OLD MALES AND 18-YEAR-OLD MALES 1979-1985, BY MAJOR ETHNIC GROUP[a]
(Millions of People)

Ethnic Group	Total Population					Number of 15 to 19-Year-Old Males					Number of 18-Year-Old Males				
	1979	1980	1985	1990	1995	1979	1980	1985	1990	1995	1979	1980	1985	1990	1995
Slavs	189.21	190.13	194.81	199.21	202.98	8.14	7.92	6.79	6.74	7.03	1.627	1.582	1.357	1.348	1.408
Russians	137.40	138.14	141.91	145.64	149.24	5.98	5.82	5.01	5.03	5.25	1.195	1.163	1.002	1.005	1.051
Ukrainians	42.35	42.47	43.07	43.59	43.61	1.74	1.69	1.42	1.39	1.44	0.348	0.337	0.284	0.278	0.289
Belorussians	9.46	9.52	9.83	9.98	10.13	0.42	0.41	0.36	0.32	0.34	0.084	0.082	0.071	0.065	0.068
Baltic Peoples	5.31	5.32	5.37	5.44	5.51	0.21	0.17	0.17	0.17	0.18	0.043	0.041	0.035	0.035	0.036
Muslim-Turkic Peoples	45.72	46.79	52.56	58.71	64.76	2.74	2.68	2.68	3.00	3.11	0.549	0.547	0.536	0.600	0.622
All Other People	22.20	22.28	22.71	23.35	23.98	0.94	0.78	0.78	0.82	0.85	0.188	0.183	0.156	0.163	0.170
USSR	262.44	264.52	275.45	286.71	297.23	12.03	11.79	10.42	10.73	11.17	2.407	2.353	2.084	2.146	2.236

[a]Calculations are based on application of equations to each line item, except for the total for Slavs which is the summation of Russians, Ukrainians, and Belorussians.

from about 67 percent of the cohort in 1980 to about 62 percent in 1995.

- The percentages represented by Baltic peoples and All Other Peoples (Armenians, Georgians, Germans, Poles, Jews, etc.) in the cohort will also decline during the 1980-1995 period.
- Muslim-Turkic peoples comprise the only group for which the percentages of 18-year old males in the Soviet total will increase--from about 23.5 percent in 1980 to about 28.7 percent in 1995.
- The Muslim-Turkic group is also the only one which will gain in its share of the total population of the Soviet Union in this period, as all other groups will lose in relative strength.
- The numbers of 18-year-old males will reach a nadir of about 2.15 million in 1985 but will increase thereafter to about 2.32 million in 1995. The numbers of Russian draft-age males will also increase slightly from 1985 to 1995 but their percentages of the Soviet totals will continue to decline.
- While the numbers of Muslim-Turkic draft-age males will increase steadily from 1980 through 1985 their percentage of the Soviet total will reach a peak of 28.9 percent in 1990 and will remain at this figure in 1995.

4. EVALUATION OF THE RESULTS

We accept FDAD estimates as the standard against which to judge the correctness of the estimates obtained by the use of our equations. It has already been observed that the FDAD does not currently publish estimates by ethnic group. But we can compare its estimates of the future total population of the USSR and the number of 15 to 19-year-old males with the estimates we have derived. This is done in Table 8, in which FDAD's high, medium, low, and constant series are presented along with those we obtained by applying our equations as described on p. 20.

Table 8 shows that the differences between FDAD and Rand estimates are not very great, and indeed are rather small considering the possibilities for error. Therefore we have a certain amount of confidence that our estimates of total population and of draft-age males by ethnic group are not too wide of the mark. FDAD's estimates--particularly those

Table 8

COMPARISON OF FDAD AND RAND ESTIMATES OF TOTAL SOVIET POPULATION AND NUMBER OF 15 TO 19-YEAR OLD MALES, 1980-1995[a]
(Millions of People)

Series	Total Soviet Population				Implied Annual Rates of Increase in Total Population (%)			Number of 15 to 19-Year-Old Males			
	1980	1985	1990	1995	1980-85	1985-90	1990-95	1980	1985	1990	1995
FDAD											
High	266.15	280.90	295.08	308.25	1.08	0.99	0.88	12.39	10.27	10.68	12.25
Medium	265.05	277.74	289.21	299.09	0.94	0.81	0.67	12.39	10.27	10.68	11.70
Low	264.00	274.58	283.33	289.93	0.79	0.63	0.46	12.39	10.27	10.68	11.15
Constant	265.12	278.20	290.36	301.22	0.97	0.87	0.74	12.39	10.27	10.68	11.74
Rand											
(a) By ethnic group and republic	264.83	277.15	289.20	301.32	0.84	0.84	0.80	11.96	10.76	11.04	11.58
(b) By SU totals of each group	264.75	276.09	287.90	299.67	0.91	0.85	0.82	11.84	10.53	10.91	11.42
(c) By combined groups	264.52	275.45	286.71	297.73	0.82	0.80	0.76	11.79	10.42	10.73	11.17
(d) By republic	264.66	275.73	287.13	298.34	0.82	0.81	0.77	11.78	10.47	10.76	11.25
(e) Whole USSR	264.85	274.31	284.75	294.71	0.74	0.75	0.69	11.58	10.15	10.45	10.87

Notes:

(a) From Table 5
(b) From Table 6
(c) From Table 7
(d) Table not included but available
(e) By applying equations to entire USSR without breakdown

[a] FDAD's preferred set of estimates is the Medium Series; Rand's is Case A.

of 15 to 19-year-old males--are more accurate than those of Rand, having been derived by the cohort-component method. Unfortunately there is as yet no breakdown of their data by ethnic group, and hence the effort described in this Note.

It is interesting that as the basis of Rand estimates in Table 8 becomes more detailed and less aggregated, the numbers increase. The highest estimates result from individual treatment of each ethnic group in each republic, and the lowest estimates from treating the USSR as a whole. As previously noted, we believe that the most detailed set of estimates is the most accurate.

VI. SPECULATIONS ABOUT THE IMPLICATIONS OF THE RESULTS

Any serious attempt to assess the implications of the ethnic-demographic changes occurring in the USSR implies a vast research effort on matters far beyond the purview of this short paper. Sociological, political, economic, educational, and military factors would have to be studied within a conceptual framework designed to evaluate the effects of the changes. Therefore in what follows we simply note some of the major policy options available to the Kremlin for alleviating its manpower problems, especially for the military, and comment briefly upon these options. They include the following:

- Economic reform to increase labor productivity, thus lessening labor requirements. The military establishment might be induced to support reform in exchange for promises of steady supplies of new recruits, especially Slavs.
- Reduction in the total size of the armed forces, and of those portions primarily composed of Slavic personnel.
- Temporary reduction of deferments of Slavs and increase in the deferments of Central Asians.
- Introduction of more weapon and support systems with capital intensive, labor saving characteristics.
- Increased use of non-Slavs in military positions currently reserved for Slavs.
- Use of military construction units enlarged with additional Central Asian recruits on civilian construction projects, thus releasing Slavic construction workers for the armed forces.
- Extension of the term of service in all branches of the military from the present two years to three years (the current term for the Navy).
- Raising the civilian retirement age and persuading existing pensioners to return to the labor force.
- Continuing with a "muddling through" policy of no change in present policies dealing with the Sovietization of minorities, equality of material well-being among the republics, increased emphasis on the universal use of the Russian language, gradual improvement of educational levels throughout the USSR--all of which tend to alleviate ethnic-demographic problems over the long-run and

to improve the quality and productivity of civilian and military manpower.

The most effective measure and the one least likely to succeed, for quite a while at least, is economic reform. The resulting rise in productivity would reduce labor requirements and thus make more 18-year-old males available to the military each year. The history of the USSR's attempts at economic reform strongly suggests that no really effective reform can long endure within the Soviet political framework.

Another possibility is reduction in the size of the armed forces, an event which occurred during the Khrushchev era. This does not seem at all likely at present, however, with a hostile China next door and a substantial build-up of U.S. military power now beginning. Nor does it appear likely that elements of the armed forces primarily composed of Slavs can be reduced since these elements include the Rocket Forces, the Air Forces, and the Navy. It is more probable that deferments of Slavic personnel could temporarily be lowered and those of Central Asians raised. This is especially true considering the growing complexity and sophistication of Soviet weaponry which require skilled personnel for their operation and especially for their maintenance. For the same reason the increasing deployment of modern weapon and support systems requiring large capital outlays are unlikely to be labor-saving. The option of using non-Slavs in military positions currently reserved for Slavs holds only limited promise in view of the ethnic problems and associated risks noted by Wimbush and Alexiev (N-1486/1, cited previously). A measure that might prove helpful is to use military construction battalions, enlarged by additional recruitment of Central Asians, for civilian construction projects from which Slavs could then be released for military service. Quantitative data for assessing this proposal are not available. An action which would reduce the military's annual intake of 18-year-old males would be to extend the term of service for all forces from the present two years to three years, as is currently the case with the Navy. This would lower the number of inductees from 1.7 million per year to about 1.2 million per year. This is probably the most effective measure which the Kremlin could take and the one with the most immediate effect.

In the civilian sector possibilities exist for increasing the supply of labor, thus reducing civilian demand for draft age males and leaving them free for military service. The retirement age in the USSR is relatively low, 55 for women and 60 for men. The January 1979 census recorded 40 million pensioners. Some of these are too aged, or infirm, or disabled to work, and others do not care to work. An unknown number, probably several million, are engaged in part-time employment. But there may be a few million who could be induced to return to the labor force. Another possibility is to raise the retirement age--a proposal being discussed in the United States for different reasons. Theoretically, the length of the work week could be increased from its present 40.5 hours. This measure would not be popular with the Soviet people, already hard pressed for time to cope with the maddening vicissitudes of daily life, and would probably raise the already high rate of absenteeism and lower the levels of productivity.

The Kremlin may elect one or more of all the alternatives noted above. But one strong possibility is that the Soviet leadership will in the main simply muddle through by continuing with current policies. It will count on its present ways of solving the nationalities problem, Sovietizing all groups of peoples, promoting the universal use of the Russian language, improving educational levels, suppressing ethnic unrest and tendencies toward regionalisms, and tinkering with economic reform. If this is the Kremlin's choice, some modest progress may be made toward its ultimate goals but with a concomitant cost in lessening economic and military efficiency. The sheerly numerical problem of securing enough recruits in toto will probably be at least partially overcome in the next decade or so, but the perceivable ethno-demographic trends will be troublesome for the leadership and the armed forces to cope with and will reduce military effectiveness to a level less than that achievable in the absence of these trends.

Appendix

DETAILS OF RAND ESTIMATION PROCESS

A. EQUATIONS FOR ESTIMATING A SOVIET POPULATION

Three equations were developed by relating future population growth in each republic, in terms of annual rates of increase during selected time periods, as estimated by FDAD in their medium series, to observed annual growth rates between 1959 and 1970, and 1970 and 1979, as shown by Soviet census data. The following tabulation contains the basic data required.

	Annual % Increase in Total Population (Soviet Census)		Estimated Annual % Increase in Total Population (FDAD Medium Series)		
Republic	1959-70	1970-79	1979-85	1985-90	1990-95
RSFSR	0.93	0.62	0.59	0.40	0.23
Ukraine	1.08	0.61	0.48	0.34	0.24
Belorussia	1.00	0.67	0.85	0.72	0.59
Uzbek	3.30	3.00	2.92	2.81	2.55
Kazakh	3.25	1.36	1.76	1.61	1.34
Georgia	1.37	0.76	1.11	1.04	0.82
Azerbaidzhan	3.00	1.83	2.14	2.16	1.90
Lithuania	1.32	0.92	0.64	0.62	0.55
Moldavia	1.94	1.13	1.15	0.92	0.75
Latvia	1.11	0.73	0.13	0.08	0.08
Kirghiz	3.21	2.09	2.39	2.21	2.07
Tadzhik	3.53	3.05	2.95	2.84	2.52
Armenia	3.20	2.20	1.89	1.62	1.34
Turkmen	3.25	2.76	2.78	2.70	2.43
Estonia	1.12	0.87	0.23	0.27	0.13

As an example, to obtain a population estimate for 1985, a linear regression equation was developed ($Y = a + bX$) relating FDAD's estimated rates of population growth (medium series) from 1979 to 1985 (Y) to observed rates of population growth in each republic from 1959 to 1970 (X). The equation of the least squares line is $Y = -0.43 + 0.87\ X$. The standard error of estimation for this is $S_{y/x} = 0.35$; $r = 0.937$; $r^2 = 0.878$; the F-ratio is 93.1; the confidence limits (95%) for r range from 0.817 to 0.991;

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confidence limits (95%) for b range from 0.67 to 1.06. Using this equation with the Soviet figures on the 1979 populations of each ethnic group, we obtained estimates of the annual rates of increase for each group (in each republic, and in toto for the USSR) and thus estimated its 1985 level. The 1985 estimates were carried forward by two additional equations. The first of these related FDAD's (medium series) estimated population growth rates 1985-1990 (Y) to observed rates of growth in each republic 1970-1979 (X). The equation is $Y = -0.20 + 1.03\ X$. $S_{y/x} = 0.10$; $r = 0.948$; $r^2 = 0.899$; the F-ratio = 116.1; the confidence limits (95%) for r range from 0.848 to 0.983; the confidence limits (95%) for b range from 0.96 to 1.10. The third equation relates FDAD's estimated population growth rates (medium series) 1990-1995 (Y) to observed growth rates for each republic 1970-1979 (X). The equation is $Y = -0.13$ to $0.89\ X$. $S_{y/k} = 0.32$; $r = 0.926$; $r^2 = 0.858$; the F-ratio = 81.2; the confidence limits (95%) for r range from 0.787 to 0.975; the confidence limits (95%) for b range from 0.85 to 1.25.

B. EQUATIONS FOR ESTIMATING THE NUMBERS OF DRAFT AGE MALES

These four equations were developed by relating the percentage of 15 to 19-year-old males in the total estimated future populations of the USSR in each republic to the observed rates of total population increase 1959-1970 and 1970-1979 as determined from the Soviet census. The estimated future populations and their percentages of 15 to 19-year-old males were in all cases based on FDAD's medium series. The following tabulation contains the data required.

Republic	Annual % Increase in Total Population (Soviet Census) 1959-70	1970-79	Estimated % of 15 to 19-Year-Old Males in 1979 and in Estimated Future Populations (FDAD Medium Series) 1979	1985	1990	1995
RSFSR	0.93	0.62	4.48	3.25	3.31	3.60
Ukraine	1.08	0.61	4.22	3.41	3.45	3.51
Belorussia	1.00	0.67	4.85	3.67	3.44	3.53
Uzbek	3.30	3.00	6.05	5.22	5.11	5.31
Kazakh	3.25	1.36	5.68	4.59	4.24	4.48
Georgia	1.37	0.76	5.01	4.03	3.83	3.84
Azerbaidzhan	3.00	1.83	6.54	5.41	4.47	4.43
Lithuania	1.32	0.92	4.44	3.99	3.59	3.49
Moldavia	1.94	1.13	5.09	3.98	4.03	4.31
Latvia	1.11	0.73	3.67	3.16	3.54	3.53
Kirghiz	3.21	2.09	5.85	4.81	4.96	5.06
Tadzhik	3.53	3.05	6.14	5.52	5.37	5.59
Armenia	3.20	2.20	6.22	4.48	4.13	4.38
Turkmen	3.25	2.76	6.04	5.95	5.31	5.41
Estonia	1.12	0.87	3.72	3.40	3.36	3.33

The first equation relates the percentages of 15 to 19-year-old males in the total population in 1979 (Y) to percentage increases in total populations observed for 1959-1970 (X). The equation is $Y = 3.45 + 0.80\ X$. The standard error of estimate is $S_{y/x} = 0.46$; $r = 0.907$; $r^2 = 0.823$; the F-ratio is 14.3; the confidence limits (95%) for r range from 0.737 to 0.969; confidence limits (95%) for b range from 0.54 to 1.06.

The second equation relates the percentages of 15 to 19-year-old males in the total estimated population in 1985 (Y) to percentage increases in total populations observed for 1959-1970 (X). The equation is $Y = 2.68 + 0.76\ X$; $S_{y/x} = 0.38$; $r = 0.901$; $r^2 = 0.812$; the F-ratio is 56.3; the confidence limits (95%) for r range from 0.722 to 0.967; the confidence limits (95%) for b range from 0.55 to 0.97.

The third equation relates the percentages of 15 to 19-year-old males in the total estimated population in 1990 (Y) to the percentage increases observed for 1970-1979 (X). The equation is $Y = 2.76 + 0.99\ X$; $S_{y/x} = 0.44$; $r = 0.895$; $r^2 = 0.801$; the F-ratio is 52.2; the confidence limits (95%) for r range from 0.706 to 0.879; the confidence limits (95%) for b range from 0.70 to 1.28.

The fourth equation relates the percentages of 15 to 19-year-old males in the total estimated population in 1995 (Y) to observed increases in the total population from 1970 to 1979 (X). The equation is $Y = 2.98 + 0.77\ X$; $S_{y/x} = 0.24$; $r = 0.948$; $r^2 = 0.898$; the F-ratio is 114.1; the confidence limits (95%) for r range from 0.845 to 0.982; the confidence limits (95%) for b range from 0.60 to 0.92.

The percentages obtained from these equations were applied to the estimates of the population of each ethnic group derived from the equations of subsection A to obtain the numbers of 15 to 19-year-old males in each ethnic group in the indicated future years through 1995. These results were simply divided by 5 to get the numbers of 18-year-old males in each case.

C. SIMPLE VERSUS MULTIPLE REGRESSIONS

For both sets of estimating relationships, we fitted some multiple regressions using both observed 1959-1970 percentage increases in total population (X_2) and observed 1970-1979 percentage increases in total population (X_3). The multiple regressions yielded results no better, or worse, than the simple regressions.

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